

**REMARKS**

Claim 1 is rejected, and claims 2-13 are withdrawn from consideration as being directed to a non-elected invention. New claim 14, which reads on the elected Species, finds support at page 12, lines 4-12 of the specification.

Review and reconsideration on the merits are requested.

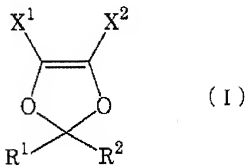
Claim 1 was objected to under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over U.S. Patent No. 4,966,435 to Matsumoto et al, or U.S. Patent No. 5,902,747 to Nemser et al, or EP 0 073 087 A1 (EP '087) or WO 00/37971 (WO 971). Each of these references was cited as disclosing PDD-containing copolymers having a glass transition temperature within the scope of present claim 1. Further, because the prior art copolymers are said to appear to be identical to the claimed copolymer, the Examiner considered that the prior art copolymers would *inherently* have an intrinsic viscosity within the claimed range.

Applicants traverse, and respectfully request the Examiner to reconsider for the following reasons.

For the manufacture of optical waveguides, a coating composition containing perfluoro organic polymer materials having a cyclic ether structure such as perfluoro-(2,2-dimethyl-1,3-dioxole) (PDD) is applied on a silicon wafer and the like to form a thin film. Uniform thin films must be formed to obtain the desired characteristics of optical waveguides. Therefore, it is necessary to improve the solubility of perfluoro organic polymer materials in solvents. Conventional perfluoro organic polymer materials have poor solubility in solvents and cannot form uniform thin films. However, the cyclic ether copolymer of the present invention solves

such problem. That is, the present invention can provide a cyclic ether copolymer having excellent solubility in solvents and from which uniform thin films are easily formed.

The present invention relates to a cyclic ether copolymer obtained from a 1,3-dioxole ring structure-containing compound represented by the general formula (I) and an ethylenically unsaturated monomer:



(wherein R<sup>1</sup> and R<sup>2</sup> are the same or different and each represents F, H, Cl or a perfluoroalkyl group containing 1 to 5 carbon atoms and X<sup>1</sup> and X<sup>2</sup> are the same or different and each represents F, H, Cl or -OR<sup>3</sup>, and R<sup>3</sup> represents a perfluoroalkyl group containing 1 to 5 carbon atoms, provided that at least one of R<sup>1</sup> and R<sup>2</sup> is F or a perfluoroalkyl group containing 1 to 5 carbon atoms),

which copolymer has a glass transition point of 100 to 135°C and an intrinsic viscosity of 0.01 to 0.4 dl/g as determined at 35°C in perfluoro-2-butyltetrahydrofuran.

The copolymer of the present invention can achieve the above-mentioned purpose by satisfying the two parameters. That is, (1) having a glass transition point of 100 to 135°C, and (2) having an intrinsic viscosity of 0.01 to 0.4 dl/g as determined at 35°C in perfluoro-2-butyltetrahydrofuran. This is proved by the results of Examples and Comparative Examples of the present invention.

Matsumoto et al discloses a copolymer of a perfluorodioxole having a glass transition temperature of not lower than 100°C. Perfluoro(2,2-dimethyl-1,3-dioxole) (PDD) is exemplified. However, the PDD copolymers of Examples 1 and 2 of Matsumoto et al have a glass transition point of 149°C and 173°C outside the claimed range of 100° to 135°C. In addition, Matsumoto et al is silent as to intrinsic viscosity.

Thus, Matsumoto et al does not specifically disclose a cyclic ether copolymer within the scope of present claim 1, and therefore also does not anticipate present claim 1.

Nemser et al discloses an amorphous copolymer of PDD and a preferred glass transition temperature of the copolymer of at least 115°C. However, the copolymer of PDD in the Examples of Nemser et al (PDD 85 mole %, tetrafluoroethylene 15 mole %) presumably has a glass transition point of 260°C outside the scope of the present claims, considering the disclosure at col. 4, lines 51-56: Examples of  $T_g$  are shown in FIG. 1 as ranging from about 260°C for the dipolymers with 15% tetrafluoroethylene comonomer down to less than 100°C for the dipolymers containing at least 60 mole % tetrafluoroethylene. In addition, Nemser et al is silent as to intrinsic viscosity.

Thus, like Matsumoto et al, Nemser et al also fails to specifically disclose a cyclic ether copolymer within the scope of present claim 1. Thus, Nemser et al also does not anticipate the present claims.

EP '087 discloses amorphous copolymers of PDD with tetrafluoroethylene, having a glass transition temperature of 85°C or higher, and the  $T_g$  of copolymers obtained in Examples 1 and 3 of EP '087 are 119°C and 105°C. However, the copolymers in Examples 1 and 3 have an apparent melt viscosity of 0.9Kpa·s and 1.65Kpa·s. On the other hand, the copolymers of Examples 1 to 3 of the present invention have an apparent melt viscosity of 198Pa·s and not

higher than 100Pa.s. That is, the copolymers disclosed in EP '087 have an apparent melt viscosity considerably higher than that of the copolymers of the present invention. For this reason, the intrinsic viscosity of the copolymers of EP '087 are assumed to be outside the claimed range as well. Applicants have suitably rebutted the Examiner's inherency position, and respectfully request the Examiner to submit objective evidence to the record if the rejection is maintained. Further, as above, EP '087 is silent as to intrinsic viscosity and does not specifically disclose the copolymer of the present invention. In addition, EP '087 is silent regarding intrinsic viscosity.

WO 00/37971 discloses a contact lens formed from a perfluorinated copolymer comprising 20 to 75 mol% of PDD and teaches a preferred copolymer glass transition temperature of about 100°C and 140°C. However, the copolymer used in the Examples of WO '971 is Teflon AF 1600 having a  $T_g$  of 160°C. In addition, WO '971 is silent as to intrinsic viscosity.

Further, as above, WO '971 does not specifically disclose the copolymer of the present claims, and the present claims therefore are not anticipated by WO '971.

Each of the above references does not disclose a copolymer identical to that of the present invention, and each is silent regarding intrinsic viscosity. Accordingly, the present invention differs from each of the above references, and therefore defines novel subject matter.

Furthermore, each of the above references neither discloses nor suggests controlling the above-mentioned two parameters, namely,  $T_g$  and intrinsic viscosity within their respective recited ranges for achieving the effects of the invention.

Consequently, one of ordinary skill in the art could not have conceived of the present invention based on the disclosure of each of the above-cited references, individually or in combination, such that the present claims are also patentable over the cited prior art.

Withdrawal of all rejections is respectfully requested.

In the event that the Examiner believes that it may be helpful to advance the prosecution of this application, the Examiner is invited to contact the undersigned at the local Washington, D.C. telephone number indicated below.

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Respectfully submitted,



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